

Installation and Operation Manual

PowerElite **ETP Series 4 - 10KVA** Uninterruptible Power Systems (UPS)



Part Number : _____

Serial Number : _____

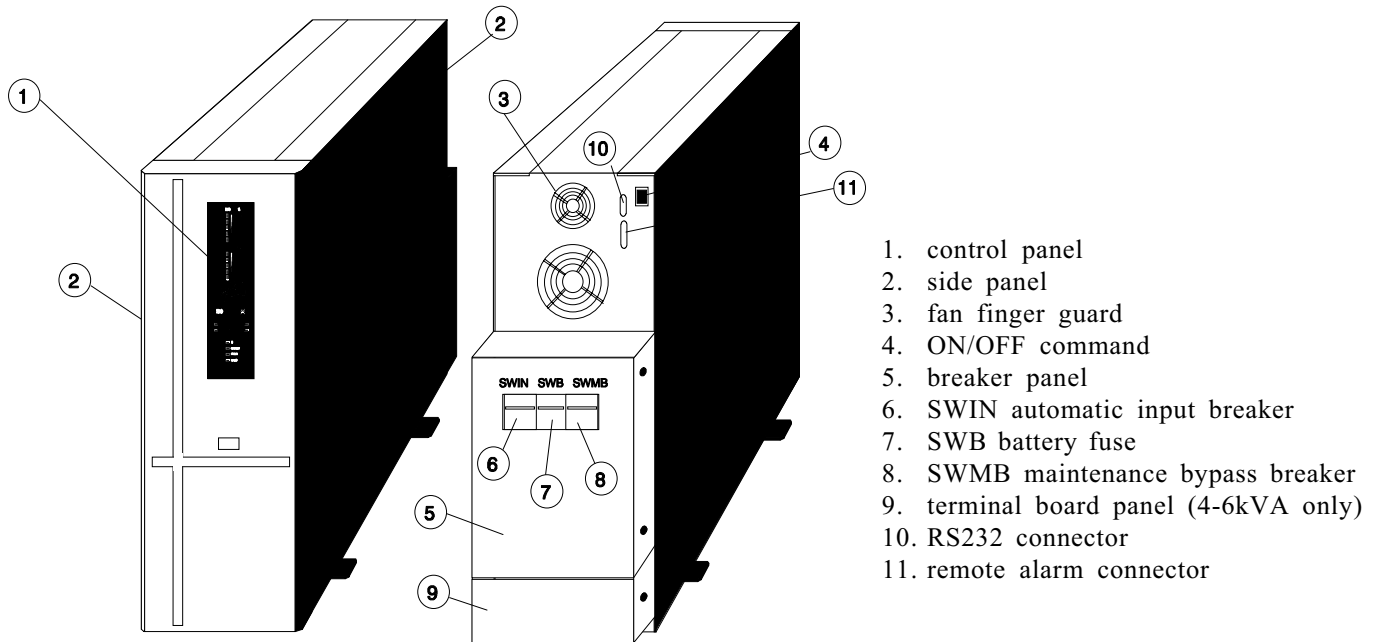
PowerElite ETP 4KVA to 10KVA

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1.LAYOUT



2. INTRODUCTION

The manufacturer is particularly specialised in the development and production of Uninterruptible Power Supplies (UPS). These UPS systems are high quality products, carefully designed to meet the highest performance standards.

This user's manual contains detailed instructions on UPS operation and maintenance. In order to get the best performance from your UPS, please read and follow carefully the instructions described in the following pages. The UPS will provide your equipment with a steady and reliable power supply for many years.

The main feature benefits of this UPS serie are :

- On line double conversion technique
- Stand-by mode to cut the operating costs
- Automatic bypass switch in the event of failure or overload of UPS
- Manual bypass switch for maintenance
- Input power factor control limits the input current value and distortion
- wide input voltage tolerance reduces the battery intervention
- high frequency switching with IGBT (insulated gate bipolar transistor) on inverter
- advanced electronics controlled with microprocessor
- Energy saving due to high efficiency
- Serial port RS 232 for UPS monitoring on computer
- REMOTE port for remote UPS monitoring enables also the UPS or inverter turning off
- Computer shutdown capability through a dedicated software package (option)
- Additional battery pack inside external cabinet to reach extended back up times (option)

2.1 Receipt of the UPS

The UPS packing consists of a board box carton and a plastic sheet inside. The assembly is shipped attached to a pallet with straps. On receipt of the equipment, check that the packing was not damaged during transport; if otherwise bring this fact to the shipper's attention, making him write down the type of damage on the delivery note.

Check that what is written on the outside label corresponds to the equipment listed on the delivery note.

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2.2 Opening the Packing

- Cut the straps and remove the carton;
- Remove the plastic wrapped around the UPS;
- Take the UPS off the pallet;
- Save the UPS packing in case of future shipments;
- Check that the UPS has not been damaged during transport
- In case of damage, immediately notify the vendor.

2.3 Contents

Additional items included in the box are:

- 3 battery protection fuses;
- 4 lifting bars;
- instruction manual and guarantee.

2.4 Storage

The batteries located inside the UPS are subject to self-discharge. For this reason, battery recharging must be performed every 6 months during warehouse storage with ambient temperature of about 20°C. If, however, the temperature is about 30°C, recharging must be done at least every 4 months. To recharge the batteries it is sufficient to power up the UPS and leave it in NORMAL OPERATION for at least 24 hours.

2.5 Nameplate

The technical data of the UPS are written on the nameplate located on the bottom rear of the UPS. Please verify if they are corresponding to these required in the order.

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3. INSTALLATION

WARNING: ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORIZED AND QUALIFIED PERSONNEL.

The Company does not assume any responsibility for damage caused by incorrect connections or by operations not described in this manual.

3.1 UPS positioning

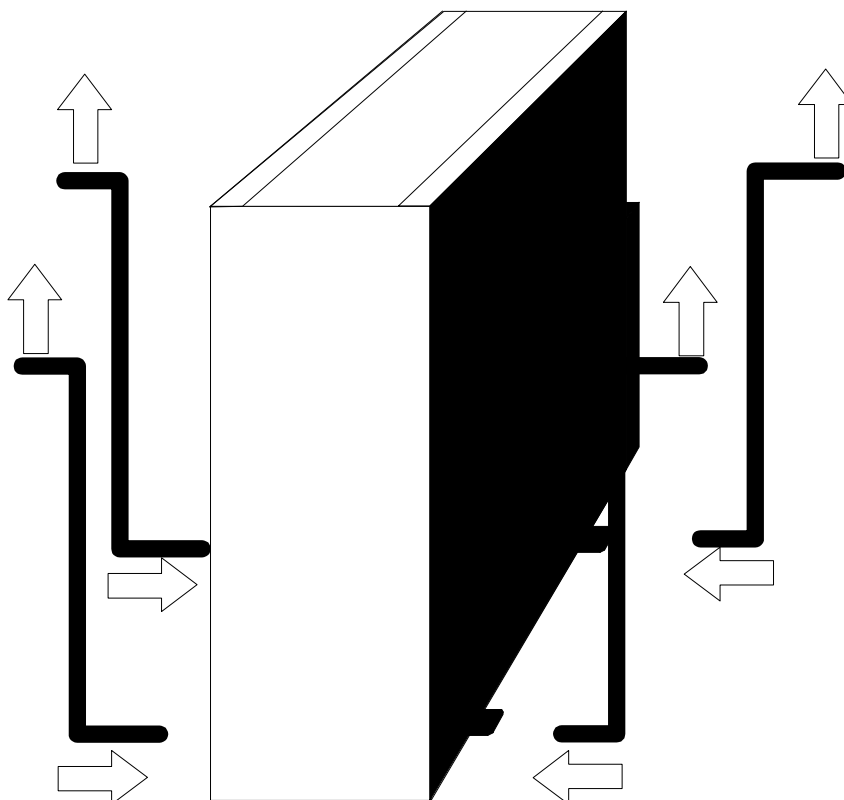
Correct installation avoids operating problems and lengthens the life of the uninterruptible power supply.

In choosing the installation site, adhere to the following points:

- avoid dusty environments;
- ambient temperature of about 25°C;
- avoid installation in locations exposed to direct sunlight or hot air.

The UPS is capable of operating in ambient temperatures between 0 and 40°C. The optimal operating temperature of the UPS and the batteries located inside is between 20 and 25°C. If in fact the average operating life of the batteries is 4 years with an operating temperature of 20°C, by increasing the operating temperature to 30°C the life of the batteries is cut in half.

To make positioning easier, included with the UPS are four lifting bars, which are to be slipped into the four holes located by the feet. Before performing the lifting (*which requires four people*), check that the bars are correctly inserted into the holes.



4. ELECTRICAL INSTALLATION

4.1 External Protections

4.1.1 Earth-leakage Circuit Breaker Protection

THE INPUT NEUTRAL IS CONNECTED TO THE OUTPUT NEUTRAL

In both the single-phase and three-phase versions, the output neutral of the UPS is connected to the neutral coming from the supply mains (if you want to have a system downstream independent from the one upstream it is necessary to insert an isolation transformer, optional). Whatever the input mains voltage, TT TN-S, IT, etc., it is carried through unchanged to the output. With the SWIN *switch* closed:

AN EARTH-LEAKAGE CIRCUIT BREAKER PLACED UPSTREAM INTERVENES FOR A FAILURE THAT OCCURS DOWNSTREAM OF THE UPS. THE ELECTRICAL SYSTEMS LOCATED UPSTREAM AND DOWNSTREAM OF THE UPS ARE IDENTICAL (*)

(*) *the voltage of the neutral is changed only when the circuit-breaker positioned upstream of the UPS is opened (because the neutral conductor is opened).*

Operating under mains voltage, the protection of the circuits connected at the outputs is always guaranteed by the Earth-Leakage circuit breaker inserted at the input, since the output circuit is not isolated from the input circuit.

Operating without mains voltage (battery powered), the intervention of the input Earth-Leakage circuit breaker is guaranteed only if it can be tripped by fault current without voltage applied to its ends (for example, the Earth-Leakage circuit breaker together with auxiliary relay is not acceptable).

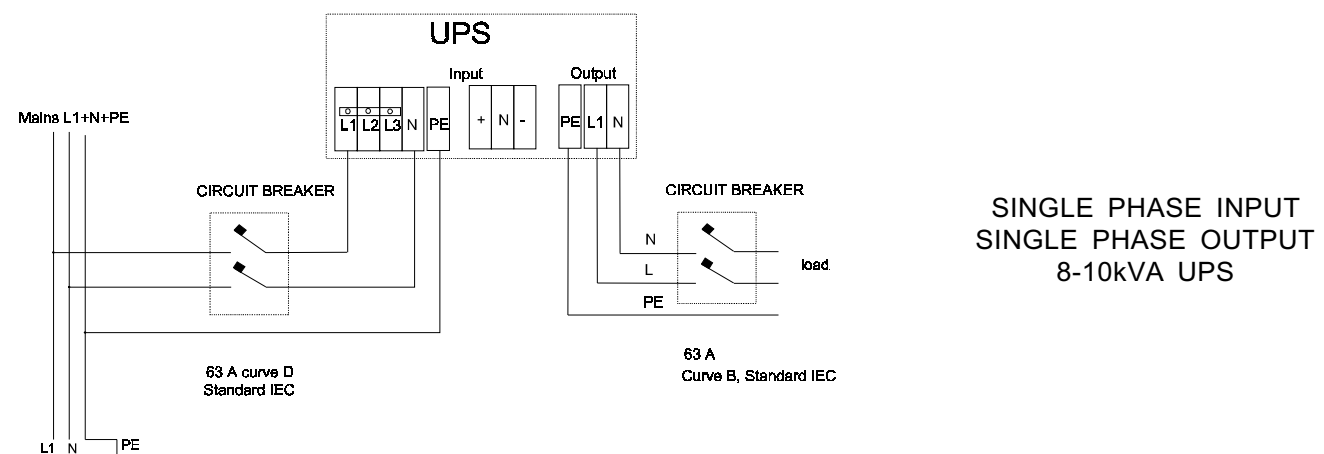
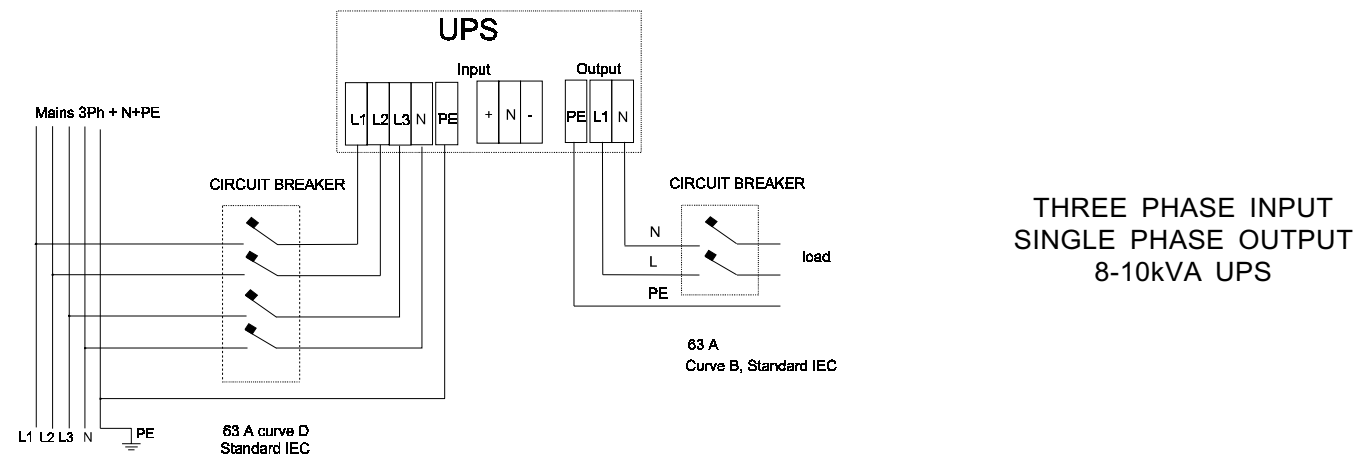
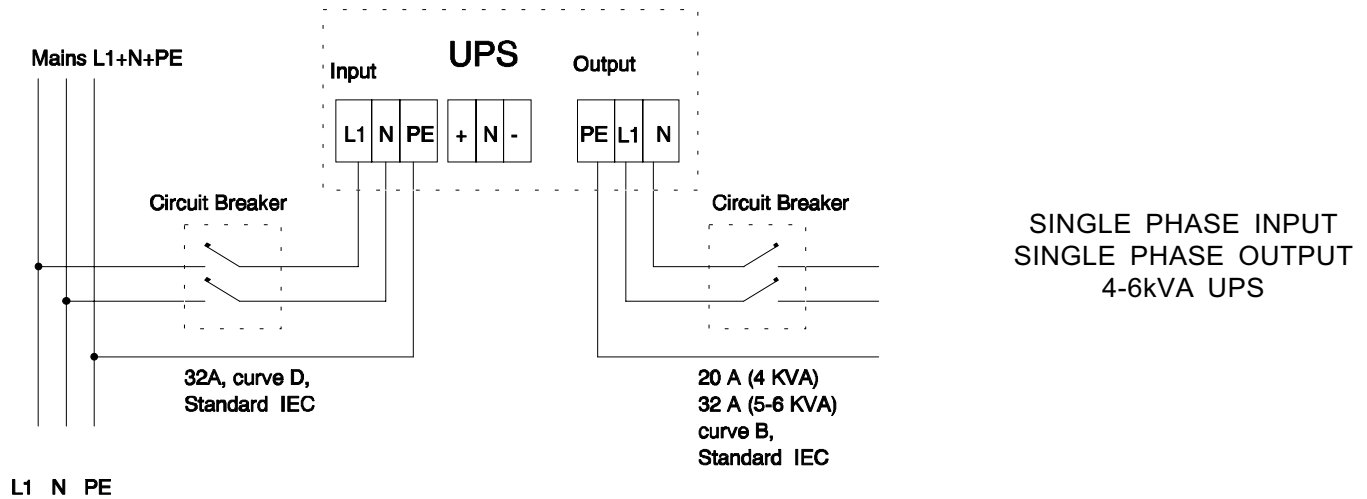
In any case it is always possible to insert additional output residual current *circuit-breakers*, possibly coordinated with the input residual current *circuit-breakers*. The Earth-Leakage circuit breaker located upstream must have the following specifications:

- residual current of 30mA if the system in which the UPS is installed has a voltage between neutral and ground not exceeding 10V, also in the presence of transistors, otherwise it is necessary to use a Earth-Leakage circuit breaker with a sensitivity of 300mA;
- class A, for alternating current and pulsating unidirectional current.

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4.1.2 Upstream and Downstream Breakers

The connection diagrams below show the terminals of the assembly and the automatic *circuit-breakers* to be installed upstream and downstream.



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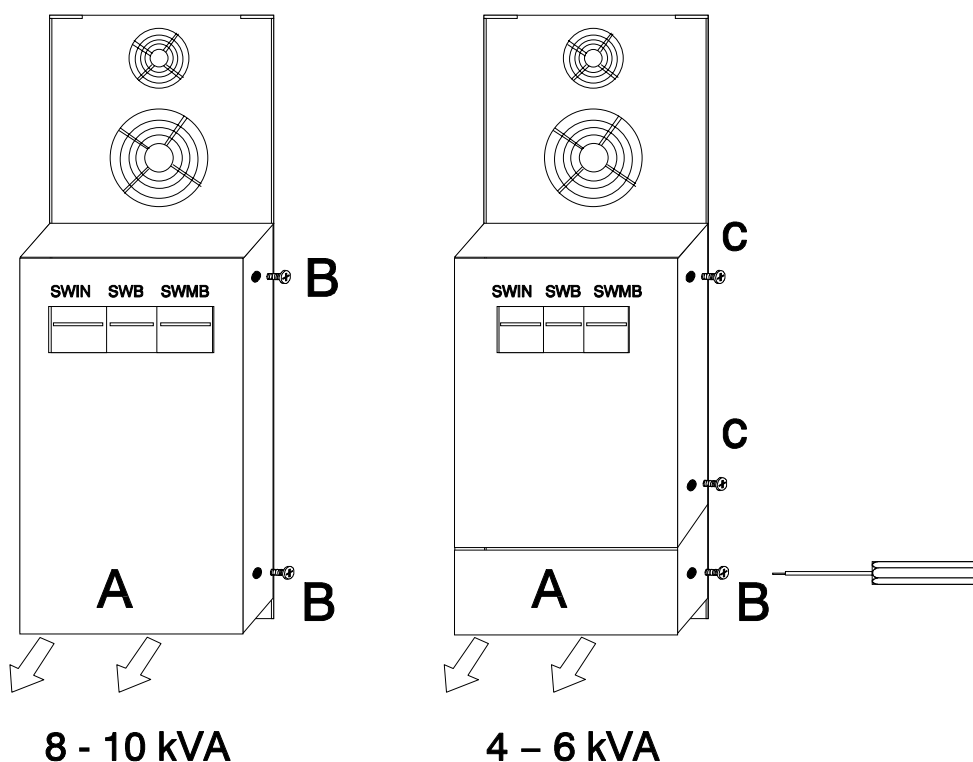
5. CONNECTIONS

5.1 Input cables connection

Before connecting the assembly to the supply mains, it is necessary to check:

- that the input voltage and frequency values correspond to those indicated on the rating plate;
- the efficiency of the grounding system.

WARNING : ENSURE THAT THE MAINS VOLTAGE IS ABSENT ,THE LOAD DISCONNECTED AND THE UPS COMPLETELY SWITCHED OFF



N.B. The UPS is off when:

SWMB, SWIN located on the back side of the unit are open “OFF”, lever down;

SWB battery fuse carriers are open;

- the ON/OFF *switch* on the rear of the UPS is in the “OFF” position.

The INPUT/OUTPUT cables must be connected to the terminal box located on the back of the unit; to access the terminal box, unscrew the two screws (B) and remove the terminal box cover panel (A).

The panel is connected by a yellow/green cable to the UPS ground; check the connection at the end of installation.

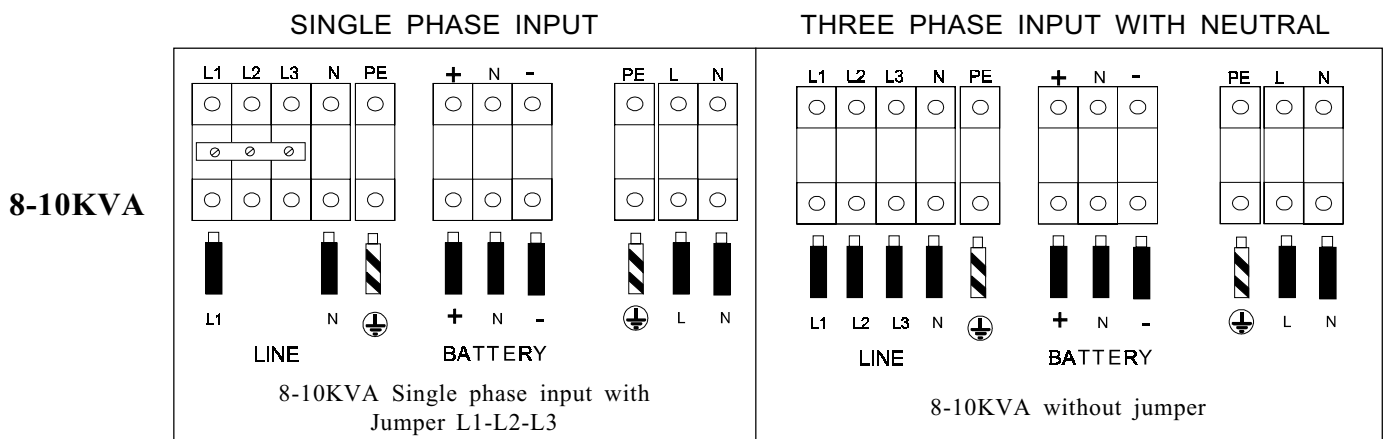
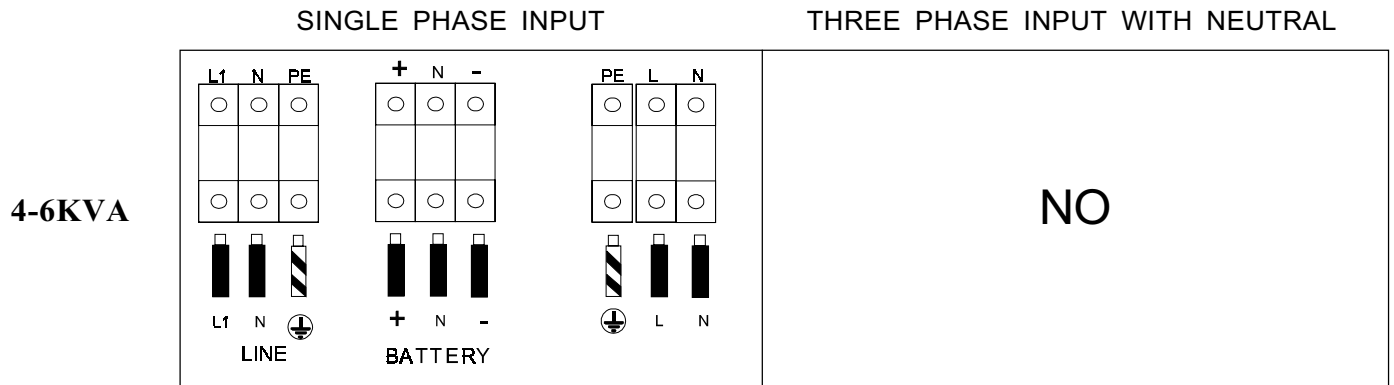
THE FIRST CONNECTION TO MAKE IS THE GROUNDING LEAD TO THE TERMINAL MARKED ‘PE’. THE UPS CANNOT OPERATE WITHOUT CONNECTION TO THE GROUNDING SYSTEM.

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5.1.1 Input/Output terminal board configuration

The 4 to 6kVA UPS units can operate only with single-phase supply.

The 8 and 10 kVA units can run either with single-phase or three-phase supply; it is necessary to set the INPUT/OUTPUT TERMINAL BOX accordingly.



WARNING

UNDER NO CIRCUMSTANCES CONNECT THE MAINS NEUTRAL TO THE TERMINAL "N" BETWEEN THE TERMINALS + AND -. THESE 3 TERMINALS ARE RESERVED FOR POSSIBLE CONNECTION WITH AN EXTERNAL BATTERY.

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To determine the dimensions of the Input and Output cables refer to the following tables:

SINGLE PHASE INPUT

	Single phase input				Single phase output		
	max.current	section(mm ²)			max.current	section(mm ²)	
	[A]	L1	N	PE	[A]	L	N
4 kVA	20	2,5	2,5	2,5	17	2,5	2,5
5 - 6 kVA	25-30	4	4	4	22-26	4	4
8 - 10 kVA	34-36	10	10	10	35-43	10	10

THREE PHASE INPUT

	Three phase input						Single phase output		
	max.current	section(mm ²)					max.current	section(mm ²)	
	[A]	L1	L2	L3	N	PE	[A]	L	N
8 - 10 kVA	13-16	10	4	4	10	10	35-43	10	10

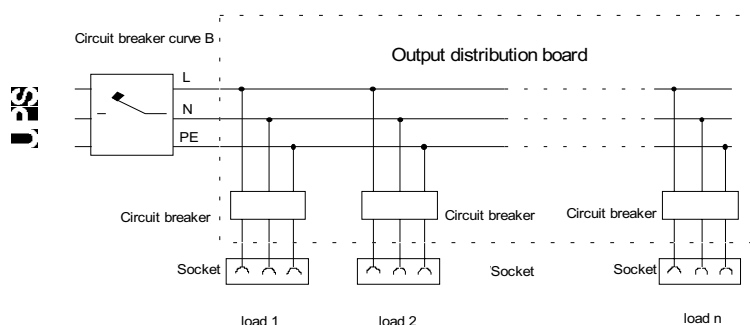
As shown in the table, the sizes of the cables of L1 phase and of input N are always determined for the current of the BY-PASS line, which is always single-phase.

N.B. anchor the input and output cables by means of the special guide located under the terminals.

5.2 Output cables connection

Distribution switchboard for n loads

Check that the total power of the load to be powered does not exceed the rated power of the UPS indicated on the rating plate. For the 10kVA model the value of the connectable output power is determined by the input connection: 7000W three-phase input, 6000W single-phase connection.

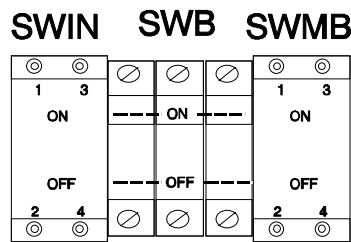


In the presence of a number n of outputs, for selectivity install a number n of *circuit-breakers*, one per output.

N.B. It is necessary to differentiate the sockets under the UPS from the normal mains sockets to avoid powering non-essential loads by the UPS.

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6. START-UP



UPS back - protection layout

6.1 UPS start-up

- ascertain that the connections are correct as indicated under the section “CONNECTIONS”;
- check that the load is disconnected;
- insert the battery fuse in the SWB fuse carrier, (type FERRAZ 600V URL 30A);
- close the SWB fuse carrier;
- close the SWIN *switch* (lever up);
- check that the SWMB *switch* is in the OFF position (lever down);
- position on ON, the ON/OFF *switch* on the rear of the UPS; after a few seconds the UPS will start up;
- if the green NORMAL ON LED is lit up, the UPS is already operating in ON-LINE mode;
- if the yellow STAND-BY ON LED is lit up, the UPS is in STAND-BY ON mode. Press the MODE push-button to transfer the UPS into ON-LINE mode.
- The UPS is started up and the load can be connected.

6.2 UPS Shutdown

Complete shutdown is done as follows:

- position the Control Panel *switch* to OFF;
- position SWIN to OFF (lever down);
- open the SWB fuse carrier.

It is recommended to shut down the UPS completely in case of long periods of inactivity. During the night or for brief periods it can be turned off by opening only the Control Panel *switch*. This operation cuts off output voltage and turns off the UPS power circuits.

6.3 Manual Bypass

The manual by-pass procedure should be used when maintenance operations are to be performed on the machine.

The steps to be performed are as follows:

- close the SWBY *switch*, lever up;
- check that the yellow BY-PASS LED is lit up;- open the SWIN *switch*, lever down;
- open the SWB battery fuse carrier.
- All the LEDs on the control panel should be off.

CAUTION: WHEN THE UPS IS RUNNING THROUGH THE BYPASS SWITCH SWMB, THE LOAD WILL NOT BE PROTECTED IN THE EVENT OF A MAINS FAILURE

The battery is not recharged when the UPS is operating in MANUAL BYPASS

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6.4 Restarting from manual by-pass

- close the SWB fuse carrier;
- close the SWIN *switch* (lever up);
- position to ON the *switch* on the rear of the UPS; after a few seconds the UPS will start up;
- open the SWMB *switch*;
- if the green NORMAL ON LED is lit up, the UPS is already operating in ON-LINE mode;
- if the yellow STAND-BY ON LED is lit up, the UPS is in STAND-BY ON mode. Press the MODE push-button to transfer the UPS into ON-LINE mode.

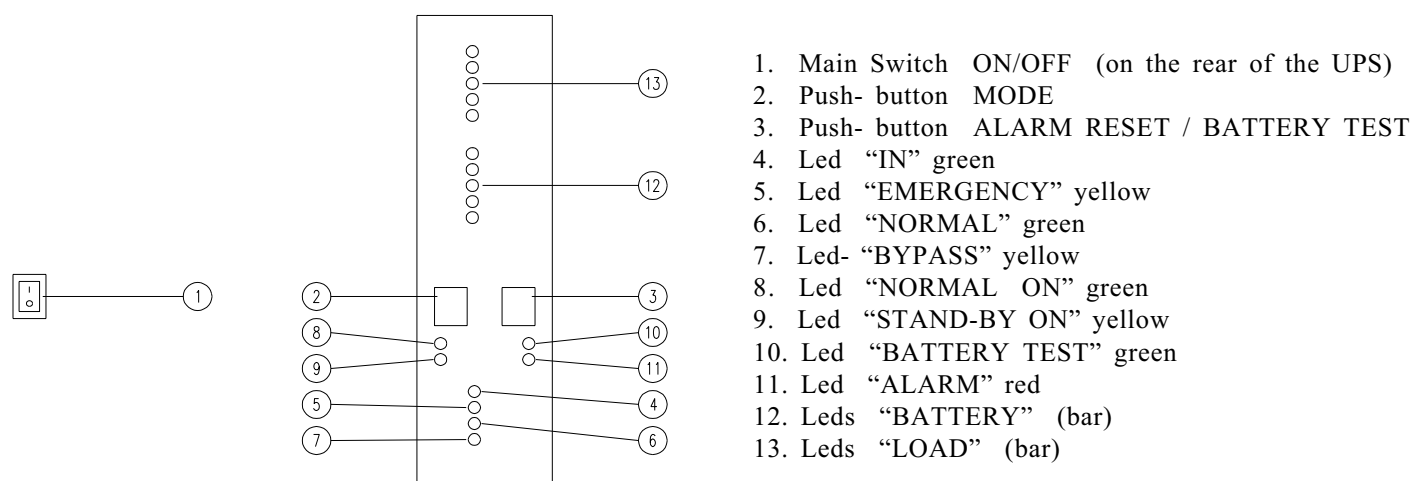
7. CONTROL PANEL

All operations are performed by means of the control panel.

The commands are simple . By pressing a button the user can choose the operating mode of the UPS (“ON LINE”/ “OFF LINE”), test the battery and reset the alarms.

In the event of an alarm condition the LED-Indicator “ALARM” and the acoustic alarm will turn on.

The operating status of the UPS may be monitored by means of the LED-indicators placed on the front panel.



7.1 Commands

1. Main Switch “ON/OFF” (on the rear of the UPS)

The UPS can be switched on or off.

Buttons

Right “Alarm RESET and Battery Test”

This button serves to silence the acoustic alarm.

Hold the button pressed for at least two second to start the battery testing procedure. During the test the green LED-Indicator “B.TEST” will flash. If the battery voltage is within the prescribed limit the green LED will turn off after approximately 2 minutes.

If the battery voltage goes below a prescribed minimum value the testing will be interrupted and the red LED-Indicator “ALARM” will turn on.

Left “ Mode”

This button serves to transfer the UPS from operating mode “ON-LINE” for highest reliability to the operating mode “STAND-BY ON” for the lowest energy consumption and vice-versa. The chosen operating mode will be indicated by the correspondent LED-Indicator.

7.2 LED-Indicators

“IN.”

This LED indicates that the mains voltage and frequency are within the prescribed limits.

“EMERGENCY”

This LED is on when the load is supplied by the inverter drawing the energy from the batteries.

“NORMAL”

This LED is on when the load is supplied by the inverter.

“BYPASS”

This LED is on when the load is supplied by the mains.

“BATTERY”

This LED-Bar indicates the battery charge status

“LOAD”

This LED-Bar indicates the percentage of load connected to the UPS

- All LEDs unlit: No load is connected to the UPS
- Last LED (red) flashing in the event of overload

“NORMAL ON”/“STANDBY ON”

These two LEDs are associated to the button “Mode “ and represent the following conditions:
green (NORMAL ON) on: UPS is in the ON-LINE Mode and guarantees therefore the highest degree of protection.

green (NORMAL ON) flashing: transmitted signal UPS_OFF from REMOTE when, UPS in ON LINE mode

yellow (STANDBY ON) on: UPS is in the STAND-BY Mode with lowest energy consumption.

yellow (STANDBY ON) flashing: send signal UPS_OFF from REMOTE, when UPS in STAND-BY ON mode

“B.TEST”

This LED is off during the normal operation

This LED is flashing when the “Battery Test” is activated

“ALARM”

This LED turns on (flashing) in the following events :

- mains power supply shutdown, input voltage and frequency out of the admitted variations, mains fault, UPS failure, UPS overload or short-circuit on the load

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8. OPERATING PROCEDURES

8.1 “On line”(normal)

By pressing the left push-button on the control panel or by a PC connected to the UPS through the serial port RS232, the UPS can be switched to the ON-LINE mode. The ON-LINE mode guarantees the highest degree of protection, because the load is always supplied from the inverter, either in presence or in absence of the mains; therefore the output power is protected from the voltage and frequency alterations of the mains. The transfer time mains -battery is zero.

This operating mode is recommended when the loads are very critical (*like the computer systems*) and do not tolerate any interruption of the supply (*even the shortest*).

8.2 “Stand-by on”

By pressing the “Mode” push-button on the Control Panel, or by sending a command by a PC connected via the serial port to the UPS, the UPS is set on STAND-BY ON mode (*the yellow “BY-PASS” LED is lit up*).

When operating under single-phase input voltage, 8-10kVA, in case of low input voltage and active output power exceeding the rated power, the UPS automatically goes into STAND-BY ON indicated by the overload LED (>100 OUT) flashing. In order to return to normal operation it is necessary to reduce the connected load and to press the MODE push-button.

In the STAND-BY ON mode the energy consumed by the UPS is considerably reduced. In fact, the load is powered directly from the mains and, only when there is a mains failure, is it switched to the inverter (battery operation). The STAND-BY ON operational mode is recommended when the connected load can accept supply interruptions on the order of about 5 ms. During STAND-BY ON operation battery recharge is assured.

8.3 “Bypass”

The Bypass-Mode is performed manually by means of the maintenance bypass switch SWMB located on the rear of the UPS (*fig. 4*). It serves only for maintenance requirements of the UPS.

SWMB ON : UPS shut off, load connected directly to the mains

SWMB OFF: Normal operating condition, load under inverter.

<p>CAUTION: WHEN THE UPS IS RUNNING THROUGH THE BYPASS SWITCH SWMB THE LOAD WILL NOT BE PROTECTED IN THE EVENT OF A MAINS FAILURE</p>
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The battery is not recharged when the UPS is operating in MANUAL BYPASS

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9. ALARMS - WHAT TO DO

In the event of an alarm condition the red LED-Indicator “Alarm” and the acoustic alarm will turn on. In this case proceed as follows:

- 1) Silence the acoustic alarm by pressing the button “Reset”.
- 2) Identify the cause of the alarm condition by means of the following table and perform the recommended actions.

<u>STATUS OF LED</u>	<u>CAUSE OF ALARM</u>	<u>RECOMMENDED ACTIONS</u>
LED “IN.” off	Mains power failure or out of tolerance	Check the battery autonomy and reduce the load
LED “IN.” off and “BATT.” 20% flashing	Battery autonomy is near the end	Save all computer data. Switch all loads off.
LED “IN.” on and “BATT.” 20% flashing	Battery discharged UPS recharging	Silence the buzzer
LED “OUT.” > 100% red	Overload	Disconnect the load in excess
All leds normal	Memorised short circuit or overload	Press button “Alarm reset”
Some leds on or off	Internal logic defect in the UPS	Switch off and turn on again. If defect remains, call for assistance

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10. MAINTENANCE

CAUTION: Maintenance inside the UPS should only be done by qualified personnel. Inside the equipment there are voltages even with the input and battery switches open. Removal of the side panels of the UPS by unqualified personnel can cause harm to the operator and damage the equipment.

EVERY THREE MONTHS WITH THE UPS COMPLETELY SHUT DOWN:

Using a vacuum cleaner, remove the dust accumulated on the UPS, especially the dust on the back fan air output grille. NEVER clean the UPS with wet sponges!

The UPS does not require particular maintenance.

The only components that need a periodic check are the fan and the batteries.

The life of the batteries is related to the operating temperature and the number of charge and discharge cycles performed.

With an operating temperature of 20°C the life of the battery (*declared by the manufacturer*) is about four years. With a temperature of 35°C this life is halved.

For perfect operation of the UPS, it is recommended to test the batteries about every three months.

How to test the battery

The battery test can be performed only if:

- the alarm is not activated;
- the UPS has not experienced a black-out in the previous 15 hours of operation.

The battery test is performed by pressing the Alarm/Test push-button on the Panel for a few seconds; the green "B.test" LED will light up and flash during the duration of the test.

At the end of the test (about 3 minutes) one of the following two situations may occur:

- Green "B.test" LED lights up continuously for about 20 seconds, then turns off = Battery OK;
- continuous red "Alarm" LED, buzzer activated = Battery not OK.

In the latter case, shut down the UPS completely, restart it and only after several hours repeat the test. If the battery still is not OK, contact Customer Service.

CAUTION

Any battery replacement should be done by qualified personnel. For disposal of the replaced parts it is obligatory to deliver them to one of the special consortiums for disposal by recycling. Batteries are classified 'toxic waste' by law.

10.1 Battery recharging

The battery is automatically recharged when the UPS is operating and the mains supply is available, independently on the operating mode (ON-LINE or STAND-BY ON).

If the load is not critical we suggest to maintain the battery fully charged during the night or weekend by switching the UPS to the STAND-BY ON-Mode.

The recharging time of the battery, after a total discharge, depends on the number of the battery packs and the UPS rated power and is approximately 8 hours for the 90 % capacity.

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11. COMMUNICATION INTERFACES

11.1 RS 232

The UPS is equipped with a RS 232 serial port (9-pole male sub-D connector) located at the rear side. By connecting a PC to the UPS and using the program “ TERMINAL” included in the software Windows it is possible to check the mains voltage and the UPS-status continually.

The communication settings of this program are : 9600 Baud, 8 bit, 1 stop bit, NO parity

The communication begins by digiting “AR”, ends by digiting “ Q”.

In the event of a malfunction the PC screen will display the details.

11.2 Remote

The REMOTE port (15-pole female sub-D connector) is located under the port RS232 at and serves :

- for remote monitoring of the UPS status
- to connect a remote EMERGENCY-UPS OFF-SWITCH of the type “normally open”

In the following table are detailed the pin functions.

Pin Nr.	Signal	Voltage free contact position (NORMAL OPERATION)
10	BYPASS_ON	OPEN
11	BYPASS_ON	CLOSE
3	BYPASS_ON	COMMON
5	BATT_ON	OPEN
4	BATT_ON	CLOSE
12	BATT_ON	COMMON
14	BATT_LOW	OPEN
13	BATT_LOW	CLOSE
6	BATT_LOW	COMMON
2, 9	N.C.	
1	OUT_+12V	+12V (100 mA max)
15	COMMON_OFF	GND
8	LOAD_OFF	connect to pin 15 to stop temporary load connected (instantaneous command not memorised)
7	UPS_OFF	connect to pin 15 (for two seconds) to permanent stop UPS (delayed and memorised command), to restart UPS is necessary send signal LOAD_OFF or from control panel push MODE button, or on the ON/OFF switch push OFF and then ON

12. OPTIONS

12.1 Additional battery cabinet

As an option, there is cabinet available, with the same dimensions as the UPS, containing additional battery packs, which in combination with the internal battery assembly are sufficient to run autonomously for up to 60 minutes at rated power.

The cabinets are equipped with isolators with fuses to guarantee protection and sectioning.

The battery cabinet is to be installed at the side of the UPS (*either on the right-hand side or left-hand side*) and the cables supplied are connected to the special terminals located on the assembly.

12.2 Isolation transformer

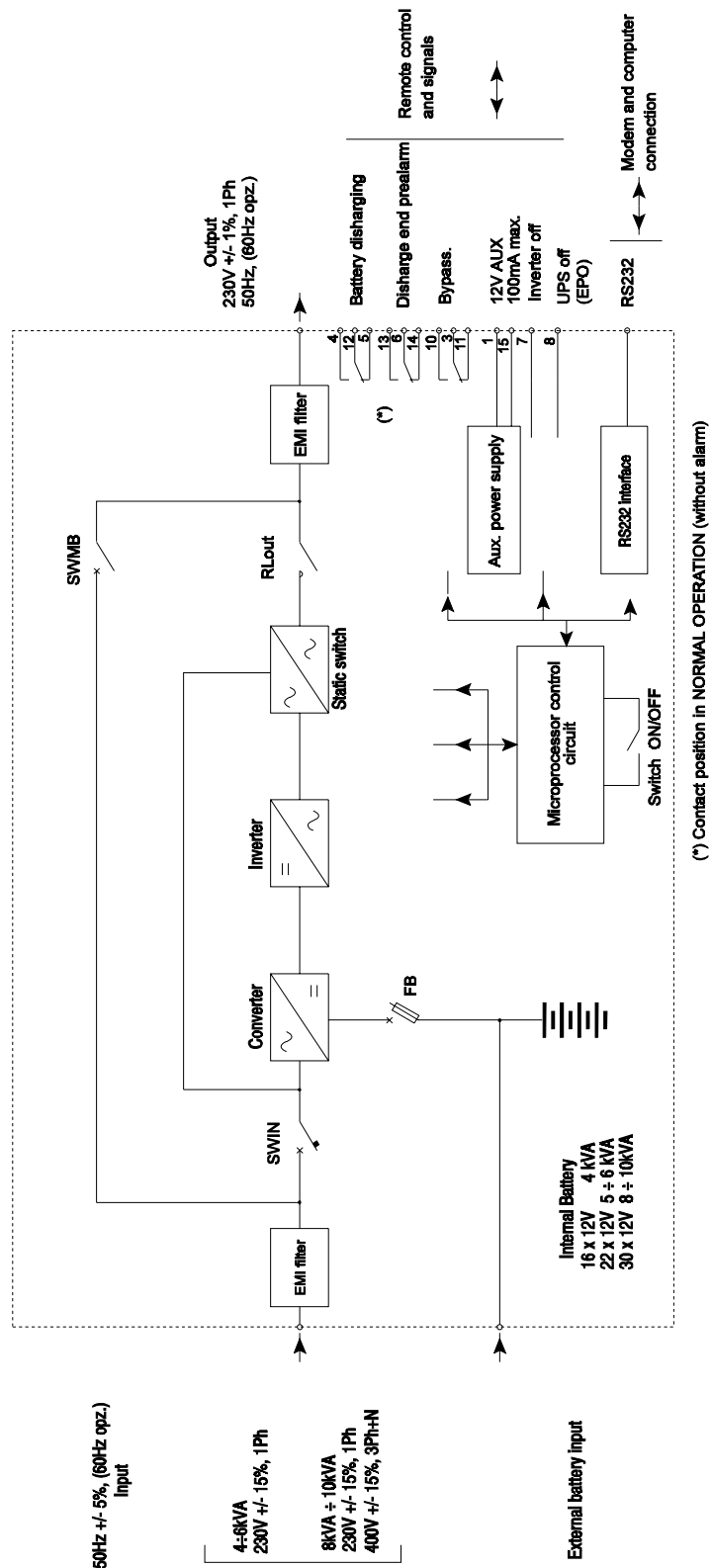
The transformer is to be positioned upstream of the UPS; it allows changing the voltage of the neutral downstream of the group; see the section ELECTRICAL INSTALLATION.

12.3 Computer shutdown utility

Interface kits (*cable and software*) are available for most commonly used computers and network operating systems including Novell, UNIX, Windows 95, Windows NT, IBM AS/400 etc.

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13. BLOCK DIAGRAM



14. BLOCK DIAGRAM COMPONENTS

14.1.1 EMI Filters

Prevent UPS and load from the electromagnetic interference of the mains. Moreover avoid outside propagation of the high frequency present inside the UPS. The filters protect the load also in “Stand-By On” and “Bypass” operation.

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14.1.2 Converter

Converts the input alternating current (AC) to the direct current (DC) suitable to supply the inverter and keep the battery fully charged. During the mains failure the converter raises the battery voltage to the constant value required from the inverter. The important feature benefits of this converter are :

- increasing of input power factor to almost 1
- reducing at very low level of the harmonics reinjected into the mains .

Consequently the AC input current drawn by the UPS is less than that supplied to the load.

14.1.3 Inverter

Takes the DC energy from the converter or the battery and synthesizes a completely new sine wave stabilized and filtered AC to supply the output loads.

14.1.4 Static Bypass

Allows to transfer automatically and without interruption the load from the inverter output to the mains in the case of :

- overload /short circuit
- overtemperature
- inverter or UPS failure

When the overload is removed, the load is automatically transferred back to the inverter.

14.1.5 Battery

Housed in the UPS cabinet, with its stored electric energy allows the system to provide the output power also when the input power is cut off completely. In this event the run time of the UPS depends on the battery capacity and the effective load supplied. An external battery pack can be connected to extend the run time of the UPS ..

14.1.6 Switch SWIN & RLout

Allow the sectioning and protection of the internal power circuits. The relay RLout is placed inside the UPS and opens automatically when UPS turn off.

14.1.7 Switch SWMB

Realises the manual bypass between input and output of the UPS and has to be activated only for maintenance or repair purposes. The operation can be carried out without interruption on the load only if the UPS is in the NORMAL ON or STAND-BY mode.

14.1.8 Communication ports

Through two connectors placed on the back of the UPS are available :

- 3 contacts voltage free for remote signalling of UPS status
- serial port RS 232
- an auxiliary power supply providing + 12V for external uses (max. 100 mA)
- 2 contacts for remote shutdown of UPS or inverter

14.1.9 Control logic with microprocessor

The advanced electronics, through the microprocessor functions, manages the power section, the control panel and the communication interfaces of UPS.

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15. SPECIFICATIONS

15.1 System

	4000VA	5000VA	6000VA	8000VA	10000VA
Operating Temperature	0°C - 40°C				
Storage Temperature	-10°C - 50°C				
Relative max. humidity without condensate	95%				
Maximum operating altitude	1000m msl				
Acoustic noise, as measured at 1m from front of equipment (depending on load and temperature) dBA	48dBA (100% load) 43dBA (<50% load)			50dBA (100% load) 45dBA (<50% load)	
Degree of protection	IP20				
Cabinet colour	RAL 7035				
Cable input	rear				
Transfer time (mains failure)	zero mode.. on-line; 3-5ms mode. standby				
Efficiency: load 100%	92%				
load 50%	89%				
mode. standby	98%				
Reference norms	SAFETY EN50091.1 EMC EN50091-2, A-level IMMUNITY EN 61000-4 part 1,2,4,5				
Dimension (W x D x H) [mm]	266 x 720 x 730				
Weight [kg]	93	105	105	125	125

15.2 Input

	4000VA	5000VA	6000VA	8000VA	10000VA
Rated voltage	230V, single phase			230V, single phase or 400V 3-phase with neutral	
Voltage range	173 - 264 V			single phase 195-264V (load 100%) 173-264V (load 85%) or: 3-phase with neutral 300-456V (load 100%)	
Single phase input current max.	20A	25A	30A	34A	36A
Three phase input current max.	-	-	-	13A phase / 8A neutral	16A phase / 10A neutral
Frequency range	45 - 65 Hz				
Input power factor	0,97			0,93 (3 phase input) 0,97(single phase input)	
Current distortion	15%			30% (3 phase input) 15% (single phase input)	

PowerElite ETP 4KVA to 10KVA

15.3 Battery

	4000VA	5000VA	6000VA	8000VA	10000VA
Type:	lead sealed				
Capacity	7 Ah				
Element number	16	22	22	30	30
Element voltage	12 V				
Standard autonomy at 25°C and load 100 % / 50 %	7' / 18'	9' / 23'	8' / 21'	8' / 20'	6' / 15'

15.4 Static Bypass Switch

	4000VA	5000VA	6000VA	8000VA	10000VA
Rated voltage [V]	230				
Rated current [A]	17	22	26	35	43
Voltage range	230 V +/- 10 %				
inverter/bypass transfer switch time	0,1 ms				

15.5 Output

	4000VA	5000VA	6000VA	8000VA	10000VA
Rated power [VA]	4000	5000	6000	8000	10000
[W]	3200	4000	4200	5600	7000 6000 (1Ph)
Rated voltage	230V monophase (option 220V , 240 V)				
Stability voltage at steady state	+/- 2 %				
Stability voltage at transient state (load 0-100 %)	+/- 5 %				
Distortion with non-linear load	3 %				
Load crest factor at rated power(Ipeak/Irms)	3 :1				
wave form	sinusoidal				
Frequency	50Hz (optional 60Hz)				
Frequency stability without synchronisation	+/- 0,1 %				
Synchronisation range:	+/- 4 %				
Overload:	125 % Pn for 120 sec, 150 % Pn for 30 sec				

(1Ph) Single phase installation